

10. *Salmo hoodi*.—As already noticed by Dr. Günther, part of the specimens called *Salmo hoodi* by Dr. Richardson belong to *S. fontinalis*. The other, a stuffed skin, I have examined in Dr. Günther's presence, and both of us were convinced that it was an ordinary *S. namaycush*. The name *hoodi* should therefore be dropped.

All the above-mentioned discrepancies between Mr. Garman's results and those reached by Dr. Bean, Professor Gilbert, and myself are more in name than in fact. No group in our vertebrate fauna offers such difficulties as the *Salmonidæ*, and it is rather remarkable that with so many different points of view such substantial agreement should exist.

INDIANA UNIVERSITY, *March 17, 1885.*

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**REPORT UPON THE ECHINI COLLECTED BY THE UNITED STATES FISH COMMISSION STEAMER ALBATROSS, IN THE CARIBBEAN SEA AND GULF OF MEXICO, JANUARY TO MAY, 1884.**

**By RICHARD RATHBUN.**

From January to May, 1884, while temporarily in the service of the Hydrographic Bureau of the Navy Department, the Fish Commission steamer Albatross, Lieut. Commander Z. L. Tanner, U. S. N., in command, made about fifty dredgings in the Caribbean Sea, and in the Gulf of Mexico off the northern side of the island of Cuba, the greatest depth reached in dredging having been 1,701 fathoms. Quite a rich collection of deep water animals was obtained, considering the small amount of time allotted to the natural history work, and at each of the ports visited the naturalists availed themselves of every opportunity to procure as complete a representation as possible of the littoral species. A list of the Echini obtained, accompanied with a few brief notes, is given below.

The shore stations at which Echini were collected, are as follows: Key West, Fla.; the island of St. Thomas; Jamaica; the island of Old Providence, off the coast of Nicaragua; the island of Curaçao, off the coast of Venezuela; the port of Sabanilla, United States of Colombia; and San Antonio, at the west end of Cuba. Only 25 species in all were obtained, and of these two are Spatangoids in very fragmentary condition, and still unidentified. Of the remainder, 9 are littoral species, although a single specimen of *Diadema setosum* was dredged at a depth of 215 fathoms, and 14 were from depths between 25 and 1,639 fathoms.

The identifications have been made by means of the recent publications of Mr. Alexander Agassiz, and a nearly complete series of the Echini supplied to the National Museum by Mr. Agassiz from the collections obtained by the Coast Survey steamer Blake in the region under discussion, from 1877 to 1880. There are but few facts to add to those already published by Mr. Agassiz in his very elaborate reports, and the notes have therefore been made very brief. Many of

the most interesting forms collected by the Blake in deep water were not obtained by the Albatross; but, as the latter steamer is now (1885) continuing her explorations in the Gulf of Mexico, it is possible that she will soon add largely to her former results.

It is but just to add that the fine condition of the many specimens brought in by the Albatross from this cruise is mainly due to the care bestowed upon them by Mr. James E. Benedict, the naturalist in charge, and Mr. Willard Nye, jr., who accompanied the steamer as a volunteer. The shore collections were almost entirely made by these two naturalists.

In the following notes the numbers inclosed in parentheses denote the catalogue numbers of the United States National Museum under which the specimens are registered.

*Cidaris tribuloides*, Blainv.

A large series of specimens of this species was obtained at Sabanilla (8391, 8612), and several specimens were taken at the island of St. Thomas (8390). Two young specimens were dredged at station 2138, latitude  $17^{\circ} 44' 05''$  N., longitude  $75^{\circ} 39'$  W., 23 fathoms (7479); and two of the same character at station 2146, latitude  $9^{\circ} 32'$  N., longitude  $79^{\circ} 54' 30''$  W., 34 fathoms (7489).

*Dorocidaris Blakei*, A. Agassiz.

Bull. Mus. Comp. Zool., vol. v, p. 185, pl. iv, 1878; Mem. Mus. Comp. Zool., vol. x, No. 1, p. 10, pl. i, ii, 1883.

Numerous specimens of the genus *Dorocidaris* were collected by the Albatross, but the majority were of small size and difficult of identification without the means of comparison with a more complete series of types than the Museum possesses. Only two species were recognized among them—*D. Blakei* and *D. papillata*. The former was positively determined from the three following stations:—

Station 2128; latitude  $19^{\circ} 55' 46''$  N., longitude  $75^{\circ} 49' 23''$  W., 400 fathoms; one characteristic fan-shaped spine (7487).

Station 2134; latitude  $19^{\circ} 56' 06''$  N., longitude  $75^{\circ} 47' 32''$  W., 254 fathoms; one large specimen (7483).

Station 2162; latitude  $23^{\circ} 10' 30''$  N., longitude  $82^{\circ} 20' 25''$  W., 122 fathoms; one medium specimen (7486).

Smaller specimens from the two following stations apparently belong to the same species:—

Station 2152;  $2\frac{1}{2}$  miles northwest of Havana Light, Cuba, 387 fathoms (7484).

Station 2153; latitude  $23^{\circ} 10' 19''$  N., longitude  $82^{\circ} 23' 10''$  W., 283 fathoms (7481).

*Dorocidaris papillata*, A. Agassiz.

All of the specimens of this species obtained were considerably under the medium size for the species, and the most of them were quite small. The several localities at which they were dredged is as follows:

Station 2129; latitude  $19^{\circ} 56' 04''$  N., longitude  $75^{\circ} 48' 55''$  W., 274 fathoms (7480).

Station 2135; latitude  $19^{\circ} 55' 58''$  N., longitude  $75^{\circ} 47' 07''$  W., 250 fathoms (7477).

Station 2152;  $2\frac{1}{2}$  miles N.W. of Havana Light, Cuba, 387 fathoms (7485).

Station 2154; latitude  $23^{\circ} 10' 16''$  N., longitude  $82^{\circ} 22' 54''$  W., 310 fathoms (7476).

Station 2157; latitude  $23^{\circ} 10' 04''$  N., longitude  $82^{\circ} 21' 07''$  W., 29 fathoms (7478).

Station 2161; latitude  $23^{\circ} 10' 36''$  N., longitude  $82^{\circ} 20' 28''$  W., 146 fathoms (7488).

Station 2162; latitude  $23^{\circ} 10' 30''$  N., longitude  $82^{\circ} 20' 25''$  W., 122 fathoms (7482).

**Salenia Pattersoni**, A. Agassiz.

Bull. Mus. Comp. Zool., vol. v, p. 187, fig. 1, pl. v, 1878; Mem. Mus. Comp. Zool., vol. x, No. 1, p. 13, pl. iv, v, vi, 1883.

Obtained at the following localities:

Station 2159; latitude  $23^{\circ} 10' 39''$  N., longitude  $82^{\circ} 20' 08''$  W., 98 fathoms; one specimen (8405).

Station 2162; latitude  $23^{\circ} 10' 30''$  N., longitude  $82^{\circ} 20' 25''$  W., 122 fathoms; one specimen (7049).

Station 2163; latitude  $23^{\circ} 10' 31''$  N., longitude  $82^{\circ} 20' 29''$  W., 133 fathoms; one specimen (7050).

Station 2164; latitude  $23^{\circ} 10' 39''$  N., longitude  $82^{\circ} 20' 29''$  W., 192 fathoms; two specimens (7051).

Station 2166; latitude  $23^{\circ} 10' 36''$  N., longitude  $82^{\circ} 20' 30''$  W., 196 fathoms; one specimen (7052).

Station 2167; latitude  $23^{\circ} 10' 40''$  N., longitude  $82^{\circ} 20' 30''$  W., 201 fathoms; one specimen (8404).

**Salenia varispina**, A. Agassiz.

Station 2117; latitude  $15^{\circ} 24' 40''$  N., longitude  $63^{\circ} 31' 30''$  W., 683 fathoms; four small specimens (8402).

Station 2118; latitude  $13^{\circ} 32' 40''$  N., longitude  $62^{\circ} 54'$  W., 690 fathoms; one small specimen (8401).

Station 2127; latitude  $19^{\circ} 45'$  N., longitude  $75^{\circ} 04'$  W., 1639 fathoms; a fine series of specimens (8403).

**Cœlopleurus floridanus**, A. Agassiz.

Station 2164; latitude  $23^{\circ} 10' 39''$  N., longitude  $82^{\circ} 20' 29''$  W., 192 fathoms; two specimens (7048).

Station 2166; latitude  $23^{\circ} 10' 36''$  N., longitude  $82^{\circ} 20' 30''$  W., 196 fathoms; one specimen (7047).

Station 2167; latitude  $23^{\circ} 10' 40''$  N., longitude  $82^{\circ} 20' 30''$  W., 201 fathoms; one specimen (8398).

**Diadema setosum**, Gray.

This species was collected at the following localities :

Key West, Florida; one specimen (7497).

St. Thomas; several specimens from the shore, and from shallow water by dredging (7493, 7494, 7495, 8431). These form a very complete series, ranging from the young to large individuals.

Old Providence Island; several large specimens (7492, 7496).

Curaçao; one small specimen (8430).

Station 2139; latitude  $17^{\circ} 52' N.$ , longitude  $76^{\circ} 45' 30'' W.$ , 215 fathoms; one small specimen (8429). The spines of this specimen are banded, as in most of the young specimens from the shore, but the darker bands are of a light reddish brown color instead of the customary bluish black. This same color occurs, however, to a slight extent on some of the shore specimens.

**Aspidodiadema antillarum**, A. Agassiz.

Bull. Mus. Comp. Zool., vol. viii, p. 73, 1880.

A fine series of this species was dredged at station 2127; latitude  $19^{\circ} 45' N.$ , longitude  $75^{\circ} 04' W.$ , 1,639 fathoms (8396).

**Aspidodiadema Jacobyi**, A. Agassiz.

Bull. Mus. Comp. Zool., vol. viii, p. 74, 1880.

Station 2131; latitude  $19^{\circ} 56' 44'' N.$ , longitude  $75^{\circ} 50' 49'' W.$ , 202 fathoms; one specimen (8392).

Station 2134; latitude  $19^{\circ} 56' 06'' N.$ , longitude  $75^{\circ} 47' 32'' W.$ , 254 fathoms; one small specimen (8394).

Station 2143; latitude  $9^{\circ} 30' 45'' N.$ , longitude  $76^{\circ} 25' 30'' W.$ , 155 fathoms; several specimens (8395).

Station 2164; latitude  $23^{\circ} 10' 39'' N.$ , longitude  $82^{\circ} 20' 29'' W.$ , 192 fathoms; one specimen (8393).

**Phormosoma placenta**, Wyv. Thoms.

A large number of specimens were dredged at station 2143; latitude  $9^{\circ} 30' 45'' N.$ , longitude  $76^{\circ} 25' 30'' W.$ , 155 fathoms (8425); and two specimens were obtained at station 2117; latitude  $15^{\circ} 24' 40'' N.$ , longitude  $63^{\circ} 31' 30'' W.$ , 683 fathoms (8424).

**Echinometra subangularis**, Desml.

Key West, Florida; a single small specimen (7226).

St. Thomas; a large series, ranging from small to medium size (7227, 7374).

Old Providence; several specimens of medium size (7228, 7375).

Curaçao; several small specimens (7376).

Sabanilla; five large specimens (7230, 7377).

**Echinometra viridis**, A. Agassiz.

A single large specimen was obtained at St. Thomas (7229), and a large series, showing considerable range in size, from Jamaica (7225, 7378). They all belong to the variety *plana*, having a somewhat flattened test, and long, rather slender spines.

There is much variation in the color of the spines which, toward the base, are frequently of a light drab (hay color), changing to greenish or a distinct green toward the tips, the latter being almost invariably marked with dark purple for a greater or less distance. The principal deviations from the above coloration depend upon the extent to which the green approaches the base of the spine, and the intensity of that color, becoming sometimes a dark olive green. The drab color is always apparent at the base of the spines, and the milled head is always whitish.

*Toxopneustes variegatus*, A. Agassiz.

Key West, Florida; one small specimen, var. *carolinus* (8410).

Island of St. Thomas; numerous specimens, with long, slender spines and a greenish color, from the shore (7516, 8408); one young specimen dredged in shallow water (8407).

Jamaica; a series of specimens, similar to those from St. Thomas (8409).

Island of Curaçao, off the coast of Venezuela; three specimens (8406, 8827), one of which (8827) is of unusually large size. This large specimen measures 90<sup>mm</sup> in diameter and 46<sup>mm</sup> in height, and has 27 coronal plates in the interambulaera; the anal system is 9<sup>mm</sup> in diameter, and the actinostome 26<sup>mm</sup>. The primary spines on the dorsal surface are about 12<sup>mm</sup> in length, and at the ambitus about 16<sup>mm</sup>. The bare median interambulaeral space is very broad, and reaches to the ambitus.

Sabanilla; two specimens of medium size, with comparatively short and slender spines (8826).

San Antonio, Cuba; one very young specimen, referred doubtfully to this species (8411).

Station 2138; latitude 17° 44' 05" N., longitude, 75° 39' W., 23 fathoms; one specimen (8415).

Station 2159; latitude 23° 10' 39" N., longitude, 82° 20' 08" W., 98 fathoms; three specimens (8416).

Station 2164; latitude, 23° 10' 39" N., longitude, 82° 20' 29" W., 192 fathoms; one specimen (8413).

Station 2166; latitude 23° 10' 36" N., longitude, 82° 20' 30" W., 196 fathoms; one specimen (8414).

Station 2167; latitude 23° 10' 40" N., longitude 82° 20' 30" W., 201 fathoms; two specimens (8412).

The specimens obtained from the several dredging stations were all of very small size.

*Hipponoë esculenta*, A. Agassiz.

Key West, Fla.; one very large specimen (8426).

St. Thomas; several specimens (8828).

Old Providence Island; one specimen (8830).

Island of Curaçao; one small specimen (8427).

Sabanilla; one specimen (8829).

The specimens from these several localities exhibit considerable variation in structure, though there is no difficulty in referring them all to this species.

**Echinocyamus pusillus**, Van Ph.-

Several dead specimens were obtained at station 2150; latitude  $13^{\circ} 34' 45''$  N., longitude  $81^{\circ} 21' 10''$  W., 382 fathoms (7116).

**Echinanthus rosaceus**, Gray.

Numerous fine specimens of this species were dredged in shallow water at St. Thomas (8419, 8420). One living specimen was obtained at San Antonio, at the western extremity of Cuba (8418), and one dead specimen at Key West, Fla. (8417).

**Mellita sexforis**, A. Agassiz.

A single living specimen was obtained at Old Providence Island (8423).

**Encope emarginata**, L. Agassiz.

A fine series of specimens in good condition was collected at Saba-nilla (8421, 8422).

**Homolampas fragilis**, A. Agassiz.

Two specimens, apparently belonging to this species, were obtained at station 2117; latitude  $15^{\circ} 24' 40''$  N., longitude  $63^{\circ} 31' 30''$  W., 683 fathoms (8397). One is comparatively perfect, the other very much broken. The perfect specimen is much larger than any which Mr. Agassiz seems to have had the opportunity of examining, measuring 26 mm in longitudinal diameter, and presents several characters resembling more those of *H. fulva*\* than would be indicated by Mr. Agassiz's original description of this species.

There are four genital openings placed rather more closely together than represented in Mr. Agassiz's figures of *fulva*, and, for the most part, two perforations instead of one to each ambulacral plate on the dorsal side. There are no large primary tubercles and spines in the posterior interambulacral area, but in the postero-lateral interambulacra, on each side, there are six such tubercles, having a somewhat concentric arrangement, in three rows, with reference to the abactinal system, there being one spine above, two in the second row, and three in the lower. These tubercles are quite closely placed, especially those of each row, and several of their spines, all of which are strongly curved, reach to or slightly beyond the posterior end of the test.

In the anterior interambulacra there are also six large tubercles, two arranged vertically above and two pairs below. Their spines are but slightly smaller than those above described. The entire arrangement of primary tubercles is much more anterior than in *fulva*, as figured by Mr. Agassiz, being included within the anterior two-fifths of the test in

\* A. Agassiz, Report on the Echinoidea of H. M. S. Challenger, 1881, p. 164.

length. The actinostome is more transverse than in Mr. Agassiz's figures of this species.

Further details cannot be safely stated without a comparison of specimens.

**Linopneustes longispinus**, A. Agassiz.

Bull. Mus. Comp. Zool., Cambridge, vol. viii, No. 2, p. 82, 1880.

One large specimen in fine condition was dredged at station 2157; latitude  $23^{\circ} 10' 04''$  N., longitude  $82^{\circ} 21' 07''$  W., 29 fathoms (8428).

**Brissopsis lyrifera**, L. Agassiz.

One specimen of medium size was dredged at station 2145; latitude  $9^{\circ} 27'$  N., longitude  $79^{\circ} 54'$  W.; 25 fathoms (7117).

**Aceste bellidifera**, Wyv. Thom.

The Voyage of the Challenger, Atlantic, vol. i, p. 376 (Eng. ed.), 1877. A. Agassiz, Report on the Scientific Results of the Voyage of H. M. S. Challenger, Zoology, vol. iii, part ix, p. 195, 1881. Verrill, Am. Journ. Sci., vol. xxviii, p. 382, 1884.

Two specimens of this species were dredged at station 2117; latitude  $15^{\circ} 24' 40''$  N., longitude  $63^{\circ} 31' 30''$  W., 683 fathoms (7115); and one very small specimen, doubtfully referred to this species, was obtained at station 2150; latitude  $13^{\circ} 34' 45''$  N., longitude  $81^{\circ} 21' 10''$  W., 382 fathoms (8399). The specimens from station 2117 are very unequal in size, one measuring about  $26^{\text{mm}}$  in length, and the other about  $10^{\text{mm}}$ . The prevailing color of the smaller specimen is a very light-purplish gray, while the peripetalous fasciole is colored dark purple, and forms on the dorsal surface a distinct pentagonal figure, broken at the anterior end. In the larger specimen this fasciole is not colored differently from the remainder of the test, which is of about the same shade as in the smaller specimen, though there are some undefined darker markings on the dorsal surface near the posterior end. The specimen from station 2150 is only about  $5^{\text{mm}}$  in length, and differs considerably from the larger specimens. It may possibly be the young of some other species.

This species was obtained by H. M. S. Challenger, in the Atlantic Ocean, only in the vicinity of the Canaries, and in latitude  $35^{\circ} 39'$  S. It was not collected at all by the Coast Survey steamer Blake in its explorations of the Gulf of Mexico and Caribbean Sea. It has, however, been dredged by the steamer Albatross off the eastern coast of the United States, at a depth of 1,467 fathoms (Verrill, *loc. cit.*).

**Agassizia excentrica**, A. Agassiz.

A single living specimen, measuring about  $10^{\text{mm}}$  in longitudinal diameter, was obtained at station 2159; latitude  $23^{\circ} 10' 39''$  N., longitude  $82^{\circ} 20' 08''$  W., 98 fathoms (8400).